A Guide to TracVision C3

owner's manual

- Installation Instructions
- User's Guide
- Technical Manual

Satellite Television

KVH TracVision® C3

TracVision C3 Owner's Manual Addendum

(ECO #s 6138, 6356, 6580, 6643)

The following information applies to Revision G of the TracVision C3 Owner's Manual (KVH Part Number 54-0159).

1.3 Materials Provided with TracVision C3

The data/power cable supplied with the system is 28 ft (8.5 m) in length. The RF cable supplied with the system is 50 ft (15 m) in length. Table 1-3 has been updated to show the correct cable lengths.

Table 1-3
TracVision C3 Packing List

Component	KVH Part No.
Antenna Unit (comprising):	01-0225-20† 01-0225-23†† 01-0225-26††† 01-0225-29††††
Baseplate Assembly	02-1245-01* 02-1245-03**
Radome Assembly	02-0953-04
RF Cable (50 ft/15 m)	**32-0417-50**
Data/Power Cable (28 ft/8.5 m)	**32-0730-28**
PC Cable (6 ft/1.8 m)	32-0628-06
Mounting Plate	20-0684
Kitpack***	72-0102
Owner's Manual	54-0159
IRD Ground Wire	32-0583-50
Switchplate	02-1023-01
TV/SAT Switch *(optional)*	01-0245

† European TracVision C3 system
†† North American TracVision C3 system (defaulted to DIRECTV)
††† North American TracVision C3 system (defaulted to DISH Network)
†††† North American TracVision C3 system (defaulted to ExpressVu)
* Baseplate assembly with single-output LNB
** Baseplate assembly with dual-output LNB
*** A complete listing of kitpack contents is provided in Table 2-2.

Cables for the TracVision C3 are stored beneath the antenna unit during shipping.

5.3 Replaceable Parts

Table 5-1 has been updated to show the new part numbers for the data/power cable, RF cable, and the RF PCB.

Table 5-1
Field Replaceable Units

Part Name	Part Number
Baseplate Assembly	02-1245-01* 02-1245-03**
Radome Assembly	02-0953-04
Data/Power Cable	**32-0730-28**
RF Cable	**32-0417-50**
PC Cable	32-0628-06
CPU PCB	02-1043-02
RF PCB	**02-1342**
Antenna Gyro	02-1035
Antenna Gyro Gasket	24-0139
System Fuses	16-0017-3150
LNB (European system)	19-0196
LNB (N. American system)	19-0056
Switchplate	02-1023-01
TV/SAT Switch *(optional)*	01-0245

* Baseplate assembly with single-output LNB
** Baseplate assembly with dual-output LNB

TracVision C3 Owner's Manual Addendum

(ECO #6138)

The following information applies to Revision G of the TracVision C3 Owner's Manual (KVH Part Number 54-0159).

Table 5-1 has been updated to show the new part number for the RF PCB.

5.3 Replaceable Parts

Table 5-1
Field Replaceable Units

Part Name	Part Number
Baseplate Assembly	02-1245-01* 02-1245-03**
Radome Assembly	02-0953-04†
Data/Power Cable	32-0730-45
RF Cable	32-0417-45
PC Cable	32-0628-06
CPU PCB	02-1043-02
RF PCB	**02-1237**
Antenna Gyro	02-1035
Antenna Gyro Gasket	24-0139
System Fuses	16-0017-3150
LNB (European system)	19-0196
LNB (N. American system)	19-0056
Switchplate	02-1023-01
TV/SAT Switch *(optional)*	01-0245

* Baseplate assembly with single-output LNB
** Baseplate assembly with dual-output LNB
† Specify color when ordering

Congratulations!

You have selected one of the most advanced satellite tracking systems available today. KVH® Industries' TracVision® C3 is designed for use with European and North American DVB-compatible satellite services as well as DIRECTV®. This manual provides detailed instructions on the proper installation, use, and maintenance of your TracVision C3 system.

Throughout this manual, important information is marked for your attention by these icons:

A helpful tip that either directs you to a related area within the manual or offers suggestions on getting the highest quality out of your system.

An alert to important information regarding procedures, product specifications, or product use.

Information about installation, maintenance, troubleshooting, or other mechanical issues.

An electrical safety warning to help identify electrical issues that can be a hazard to either this KVH product or a user.

TracVision C3 Serial Number

This serial number will be required for all troubleshooting or service calls made regarding this product.

Direct questions, comments, or suggestions to:

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Click here to go to our state-of-the-art Customer Support web page...the fastest and easiest way to get all of your questions answered!

If you have any comments regarding this manual, please e-mail them to manuals@kvh.com. Your input is greatly appreciated!

KVH Part # 54-0159 Rev. G

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Appendix A System Specifications

Appendix B Comprehensive TracVision C3 System Wiring Diagram

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Appendix D Startup Data Sequence

Appendix E Maintenance Port Parser Commands

1 Introduction

1.1 Digital Satellite Television

Your new TracVision C3 satellite antenna is fully compatible with the Digital Video Broadcasting (DVB) satellites, which use the international standard for digital TV transmission, as well as Digital Satellite Service (DSS) services, such as DIRECTV. As a result, you will be able to receive and decode signals from your chosen satellite services with the proper programming and hardware (e.g., the IRD [satellite TV receiver]). Your TracVision C3 is also fully compatible with KVH's TracNet™ 2.0 Mobile High-speed Internet System *(for more information, please visit our web site at www.kvh.com).*

Your TracVision C3 comes with a pre-programmed "satellite library" of European and North American satellite services. When configuring the TracVision C3 you may choose a pair of satellites from the entire library to be active in the system and with your IRD. For the antenna to track and receive signals from two satellites, they must be within 10° longitude of each other in orbit. As a result, certain satellites can be paired only with certain other satellites. Tables 1-1 and 1-2 list the possible satellite pairs that may be selected in Europe and North America. *If the satellite service you wish to receive is not already in the "satellite library," you may also add two additional satellites of your choice to the library.*

TracVision C3's default satellite pairs are:

Europe: Astra 1 & Hotbird

N. America (US DIRECTV):
DSS_101 & DSS_119
or
N. America (US DISH Network):
Echo_119 & None
or
N. America (ExpressVu):
Expressvu & None

Refer to Section 2.5, "Selecting the Active Satellite," for instructions on selecting different satellites.

Table 1-1
Available European Satellite Pairs (European LNB required)

	Astra 1	Astra 2N	Astra 2S	Hispasat	Hotbird	Sirius	Thor
Astra 1		✓	✓		✓	✓	
Astra 2N	✓				✓		
Astra 2S	✓				✓		
Hispasat							
Hotbird	✓	✓	✓			✓	
Sirius	✓				✓		✓
Thor						✓	

Table 1-2
Available N. American Satellite Pairs (U.S.-style LNB required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu
DSS_101		✓					
DSS_119	✓						
Echo_61				✓	✓		✓
Echo_110			✓		✓	✓	✓
Echo_119			✓	✓		✓	✓
Echo_148				✓	✓		✓
Expressvu			✓	✓	✓	✓	

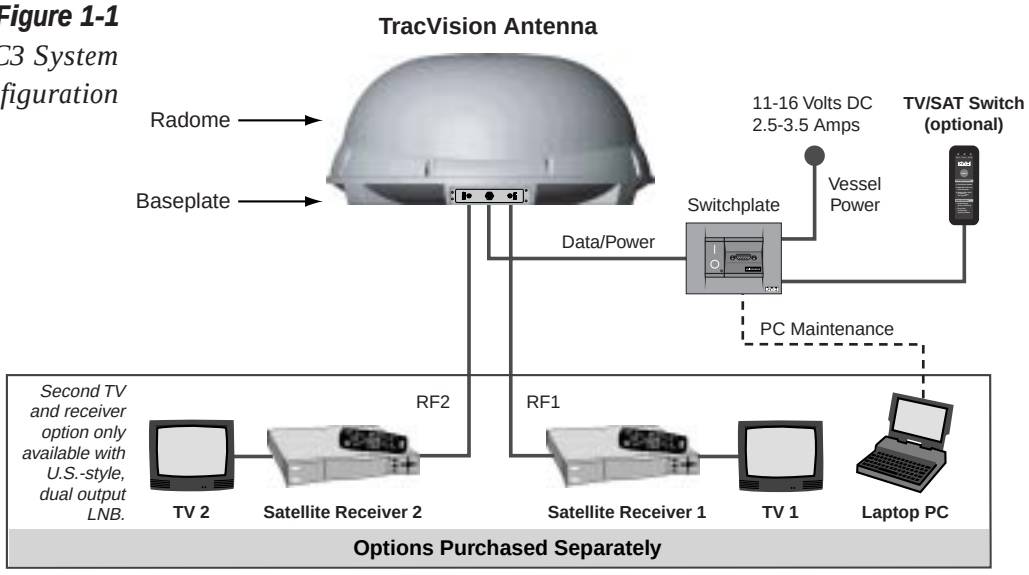
1.2 TracVision C3 System Overview

Your KVH TracVision C3 employs a state-of-the-art actively stabilized antenna system. Once the satellite is acquired, the antenna gyro continuously measures your vessel's motion and position, and transmits commands to the antenna motors to keep the antenna pointed at the satellite at all times. A complete satellite TV system includes the TracVision C3 connected to an IRD and a television set. The optional TV/SAT Switch allows you to select a satellite at the press of a button. A desktop or laptop computer is used to configure the system for satellite selection and conduct diagnostics. The complete system is illustrated in Figure 1-1.

System specifications and a wiring diagram are provided in *Appendices A* and *B*, respectively.

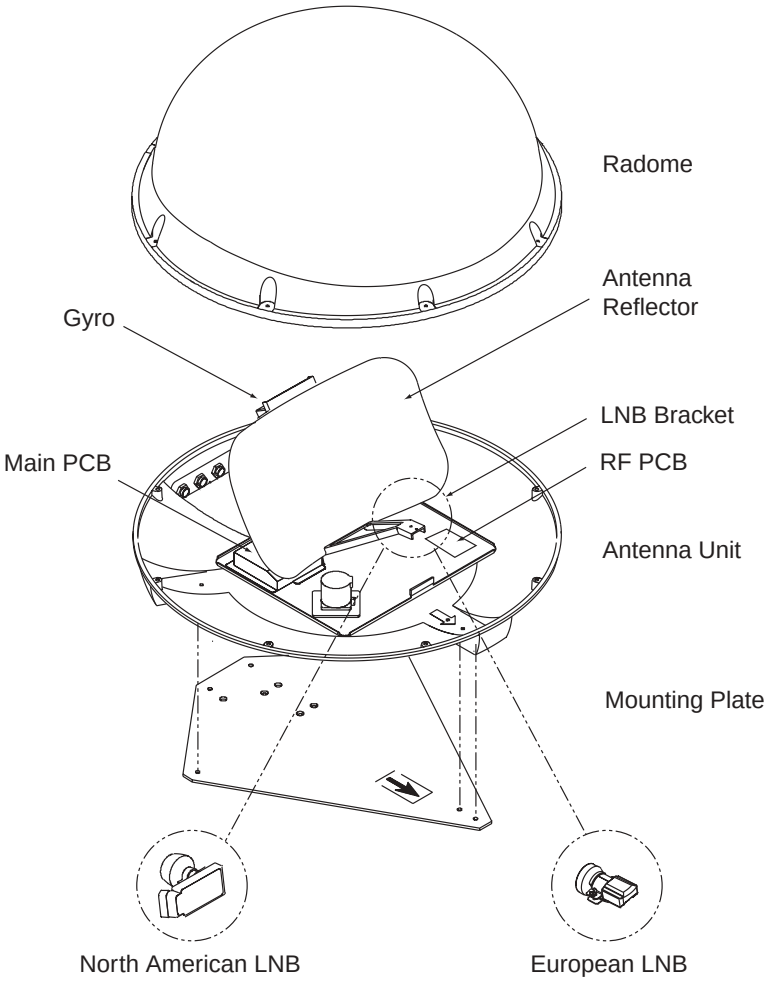
*If you are a **DISH 500** customer, you can order the optional TV/SAT Switch – **free of charge.** Simply fill out the order form located at the back of this manual and fax it to KVH at +1 401 845-8190.*

Figure 1-1
TracVision C3 System Configuration



1.2.1 TracVision C3 Components

The antenna unit includes the antenna positioning mechanism, signal front end, power supply, and control elements. These elements include antenna drive controls and mechanisms, the cable wrap subassembly, antenna gyro sensor, power conditioning and regulating circuits, and the RF detector. The antenna is a parabolic dish mounting a low noise block (LNB) converter with built-in preamplifier. The European configuration includes a single-output LNB while the North American system uses a dual-output LNB. A molded ABS radome encloses the fiberglass baseplate and is secured in place with standard fasteners. Connectors on the back of the baseplate join the power, signal, and control cabling from below-decks units.



The dual-output LNB in the North American systems allows two IRD/TV pairs to be connected directly to the antenna. Three or more pairs can be connected to the system if an active multiswitch is used. Section 2.3.5, "Connecting the Antenna RF Signal Cable to the IRD," *provides installation directions for each of these options.*

Figure 1-2
Primary Components of the TracVision C3

Always lift the antenna unit by the gray baseplate and not the radome, antenna reflector, or internal mechanical assemblies.

***NEVER** pick up the unit by the LNB or the gyro!*

Before you can start watching satellite TV using your TracVision antenna, you will need to activate your IRD. Refer to Section 2.4, "Activating the IRD," *for more details.*

1.2.2 Integrated Receiver Decoder (IRD)

The IRD (purchased separately) receives satellite signals from the antenna unit for signal processing and channel selection, and sends the signals to the TV set for viewing. The IRD also provides the interface for the user to activate authorization for reception. Please refer to the User's Manual provided with your selected IRD for complete operating instructions.

1.3 Materials Provided with TracVision C3

Table 1-3 lists the units, cables, and materials packed in the TracVision C3 package by name and KVH part number.

Cables for the TracVision C3 are stored beneath the antenna unit during shipping.

Table 1-3
TracVision C3 Packing List

Component	KVH Part No.
Antenna Unit (comprising):	01-0225-20† 01-0225-23†† 01-0225-26††† 01-0225-29††††
Baseplate Assembly	02-1245-01* 02-1245-03**
Radome Assembly	02-953-04
RF Cable (45 ft/14 m)	32-0417-45
Data/Power Cable (45 ft/14 m)	32-0730-45
PC Cable (6 ft/1.8 m)	32-0628-06
Mounting Plate	20-0684
Kitpack***	72-0102
Owner's Manual	54-0159
IRD Ground Wire	32-0583-50
Switchplate	02-1023-01
TV/SAT Switch *(optional)*	01-0245

† European TracVision C3 system
†† North American TracVision C3 system (defaulted to DIRECTV)
††† North American TracVision C3 system (defaulted to DISH Network)
†††† North American TracVision C3 system (defaulted to ExpressVu)
* Baseplate assembly with single-output LNB
** Baseplate assembly with dual-output LNB
*** A complete listing of kitpack contents is provided in Table 2-2.

1.3.1 Additional Materials Required for TracVision C3 Use

To make full use of your new TracVision C3 and receive satellite TV aboard your vessel, you will need to provide / purchase the following:

- Television
- Appropriate IRD for your selected satellite TV service

In North America, you can purchase and activate an IRD directly from KVH. Call KVH at 1-888-584-4163 for details.

2 Installation

TracVision C3 is designed for simple installation and setup. Just follow these easy steps:

Step	Refer to Section...
1. Choose the hardware locations	2.1
2. Mount the antenna unit	2.2
3. Connect system components	2.3
4. Activate the IRD	2.4
5. Select the active satellite	2.5
6. Set the skew angle (Europe only)	2.6
7. Check out the system	2.7

Table 2-1
Installation Process

Installation Tools and Materials Required

- Electric drill
- ⅜" (9.5 mm), ⅜₁₆" (5 mm), ⅝₃₂" (4 mm), and ⅜₃₂" (2.5 mm) drill bits and ¾" (19 mm) hole saw and auger bit
- ½" wrench
- #2 Phillips and #0 flat tip screwdrivers
- RG-6 or RG-11 (75 ohms) RF cable (if installing two RF cables - refer to *Section 2.3.5* for details)
- Silicone sealant, RTV, or Sikaflex
- ⁷₁₆" open end wrench
- PC with terminal emulation software such as PROCOMM or Windows Terminal or Hyperterminal

Plan the entire installation before proceeding! Take into account component placement, cable running distances between units, and accessibility to the equipment after installation.

Kitpack Contents

Table 2-2 lists the materials provided in the kitpack.

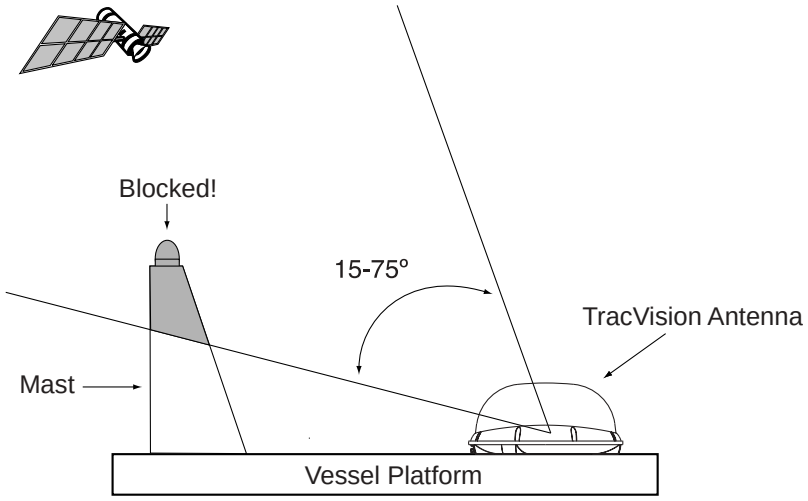
Table 2-2
Kitpack Contents

Part	Qty.	KVH Part No.
Tie-wraps	5	22-0013
¼"-20 x 3" hex head cap screws	6	14-0250-48
¼"-20 x ⅝" hex screws	4	14-0250-0010
¼" flat washers	10	14-0251
Switchplate bulb assembly (spare)	1	19-0193

2.1 Choosing the Best Location

- Since the TracVision antenna requires a clear view of the southern sky to receive satellite signals, the ideal antenna site has an unobstructed view of the horizon / satellite all around.
- Keep the antenna clear of any obstructions above decks. The antenna requires a 15º to 75º look angle to receive satellite signals.

Figure 2-1
Antenna Blockage



- The closer the antenna reference is aligned with the vessel's centerline, the smaller the pool of tracking errors will be.
- Place the antenna unit as close as possible to the intersection of the vessel's fore-and-aft centerline and midships.

- The antenna unit should not be too high off the water (a height above the waterline no more than half the vessel length).
- Make sure that the mounting surface is rigid so that it cannot flex when the vessel vibrates. If necessary, add a strength member to the mounting site to stiffen it.

Radar Concerns

The TracVision antenna must be kept out of line with nearby radars, as their energy levels may overload the antenna's front-end circuits. In an ideal installation, the antenna is mounted four feet above and four feet away from the radar (measured from the center of the antenna dome to the center of the radar).

The best placement for the TracVision antenna is above the radar. However, if there will be a significant horizontal separation between the radar and TV dome (i.e., at least 8 to 10 feet), the TracVision antenna can be placed below the radar as there will be little chance of signal blockage.

2.2 Mounting the Antenna Unit

Always lift the antenna unit by the gray baseplate, never by the radome or any portion of the antenna assembly!

The following instructions will result in a secure, effective installation and trouble-free operation of your TracVision C3.

Antenna Mounting Procedure

1. Make sure that you have chosen a suitable mounting location based upon the guidelines in *Section 2.1, "Choosing the Best Location."*
2. Remove the antenna unit from its shipping carton.
3. Remove and save the 8 pan head screws and flat washers that secure the radome to the baseplate. Carefully lift the radome straight up until clear of the antenna assembly and set aside.
4. Position the antenna unit in the desired location on the centerline of the vessel with the baseplate and mounting plate arrows facing in the same direction (either forward or aft). The mounting plate dimensions and ideal orientation of the system are illustrated in Figures 2-2 and 2-3, respectively.

The antenna's baseplate connectors may face either forward or backward along the centerline of the vessel for more convenient installation.

Figure 2-2
Mounting Plate Dimensions

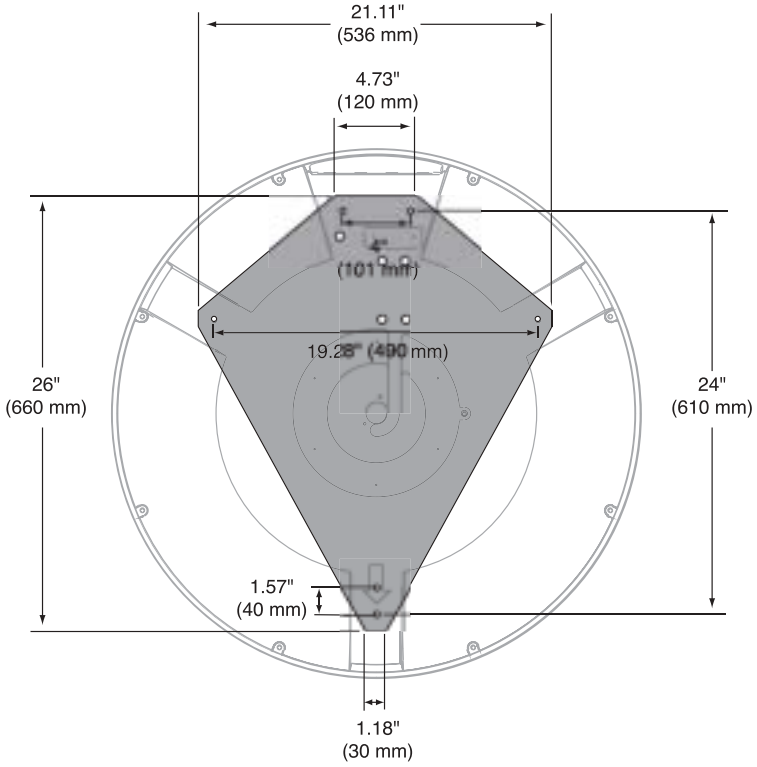
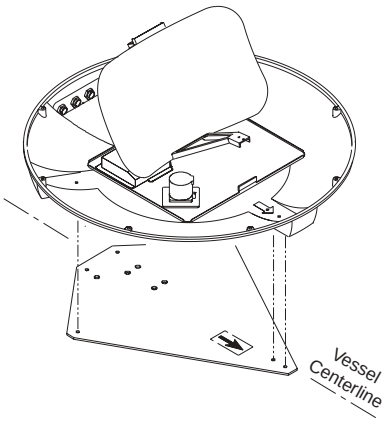


Figure 2-3
Proper Orientation of the Antenna Unit



5. While the antenna unit is in place, mark a location on the deck for the ¾" (19 mm) cable access hole to permit convenient cable access to the antenna's baseplate connectors.

6. Cut the tie-wraps holding the antenna unit to the forward shipping restraint (see Figure 2-4).

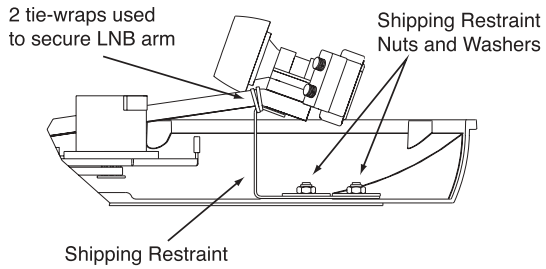


Figure 2-4
Forward Shipping Restraint (Arranged for Shipping)

7. Remove the nuts and washers that secure the antenna baseplate and shipping restraints to the mounting plate. The positions of all the shipping restraints are pictured in Figure 2-5.

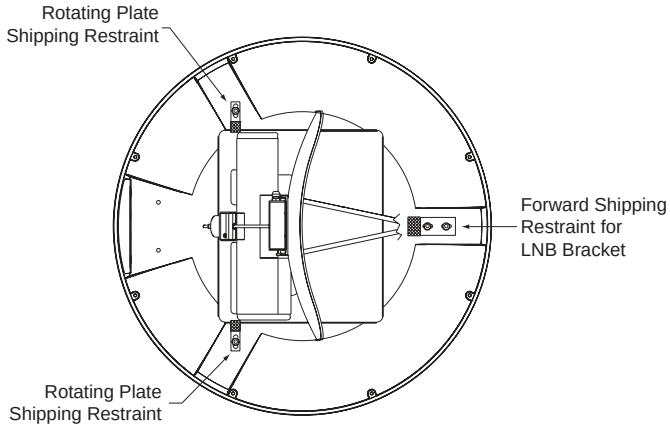


Figure 2-5
TracVision C3 Shipping Restraints (Top View, Installed for Shipping)

8. Remove the antenna unit from the mounting plate.

9. Reposition the mounting plate in the desired location on the centerline of the vessel.

10. Using the mounting plate as a template, lay out the locations of the six mounting holes (also pictured in Figure 2-2). Drill the six ⅜" (9.5 mm) holes in the mounting surface and apply a bead of silicone sealant around each hole.

Do not discard the shipping restraints. They should be stowed for future use in case the antenna unit needs to be removed and shipped to another location.

11. Reposition the mounting plate over the drilled mounting holes, lining up the the mounting plate holes with the holes in the mounting surface. Apply a bead of silicone sealant around each of the six mounting holes on the top surface of the mounting plate.
12. Place the antenna unit on top of the mounting plate, making sure all holes are aligned.
13. *(Optional)* For convenient storage, the shipping restraints may be rotated 180º and secured to the mounting bolts (see Figures 2-6 through 2-8).

Figure 2-6
Forward Shipping Restraint Storage

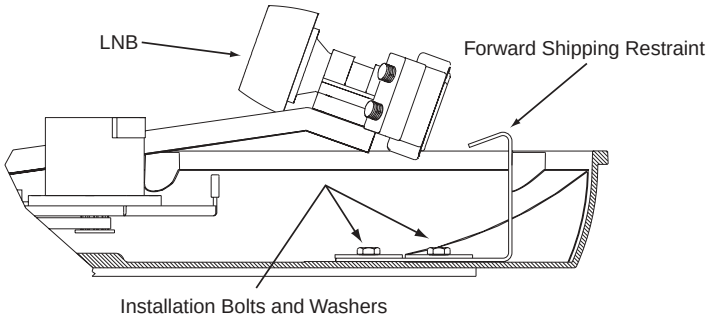


Figure 2-7
Rotating Plate Shipping Restraint Storage

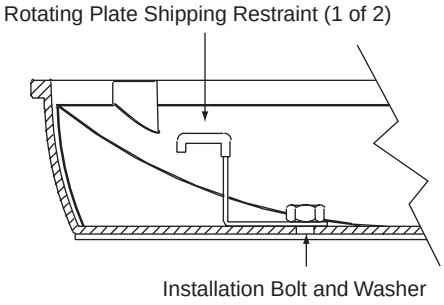
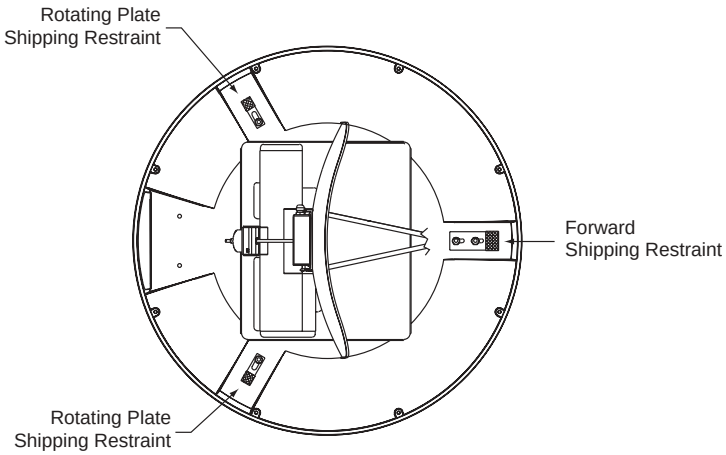


Figure 2-8
TracVision C3 Shipping Restraints (Storage Position)



14. At each hole, place a ¼" flat washer on a ¼"-20 x 3" bolt (from the kitpack) and insert it into the mounting hole from above (see Figure 2-9).

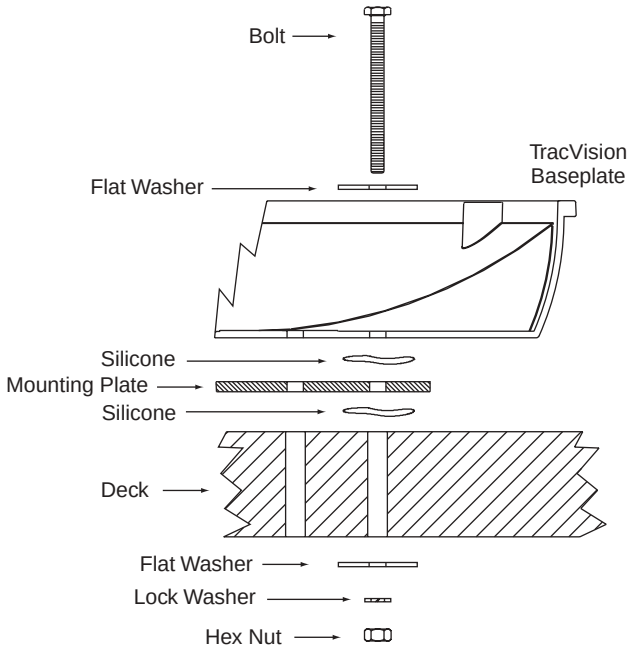


Figure 2-9
Securing TracVision C3 to the Deck

15. Apply a flat washer, lock washer, and nut (removed in Step 7) to each mounting bolt from below decks and tighten securely.

16. When the antenna unit is installed with the baseplate connectors facing the stern of the vessel, the drain holes are located as shown in Figure 2-10.

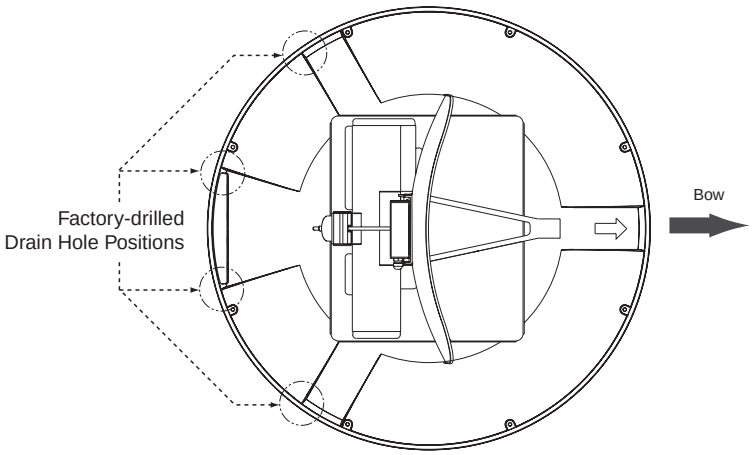
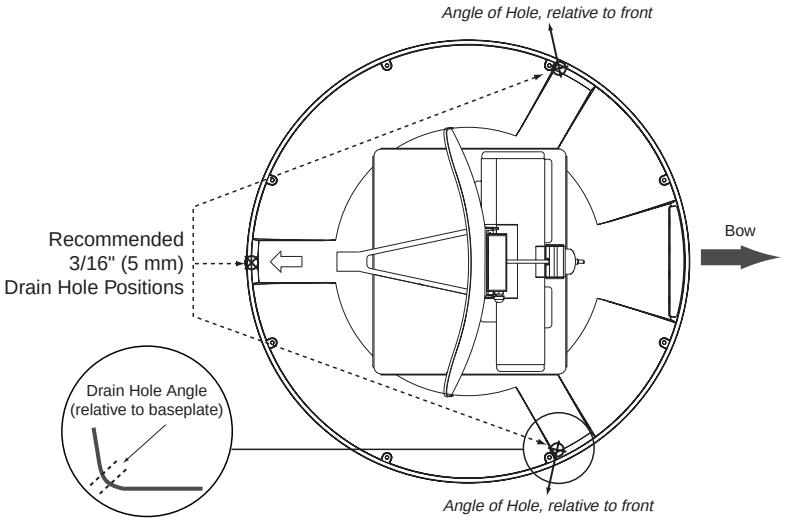


Figure 2-10
Baseplate Connectors Facing Rear of Vessel – Factory-drilled Drain Hole Locations

16a. *(Alternate Drain Hole Locations)* If the antenna unit is installed with the baseplate connectors facing the bow of the vessel, drill out 3⁄16" (5 mm)-drain holes in the rear-facing side of the baseplate as illustrated in Figure 2-11. The existing factory-drilled drain holes shown in Figure 2-10 must then be plugged with silicone rubber sealant.

Figure 2-11
Baseplate Connectors Facing Front of Vessel – Recommended Drain Hole Locations



You MUST drill out the drain holes as indicated to ensure that any moisture that enters the baseplate is able to drain. Ensure that factory-drilled holes are completely sealed.

17. Place the radome onto the baseplate (labels facing the sides of the vessel) and secure in place using the 8 pan head screws and flat washers removed in Step 3.

18. Drill the cable access hole (marked in Step 5).

2.3 Connecting System Components

The following sections provide instructions for properly wiring the antenna unit to belowdecks components.

Locating the Switchplate

A switchplate has been provided to serve as the hub of the TracVision C3 wiring (with the exception of the RF cable, which will be connected to the IRD). This switchplate includes an ON / OFF switch and a DB9 maintenance port for easy access to the antenna unit's software and diagnostics. Follow the steps below to select and prepare the switchplate mounting location.

1. Select a location to mount the TracVision C3 switchplate. It should be installed in a dry, flat location within reach of the cables that will connect to the antenna unit.
2. Once you've decided on a suitable location, create a panel cutout in the mounting surface. Figure 2-12 illustrates the mounting dimensions and a template has been provided in *Appendix C*. The connecting cables will be routed through this cutout.

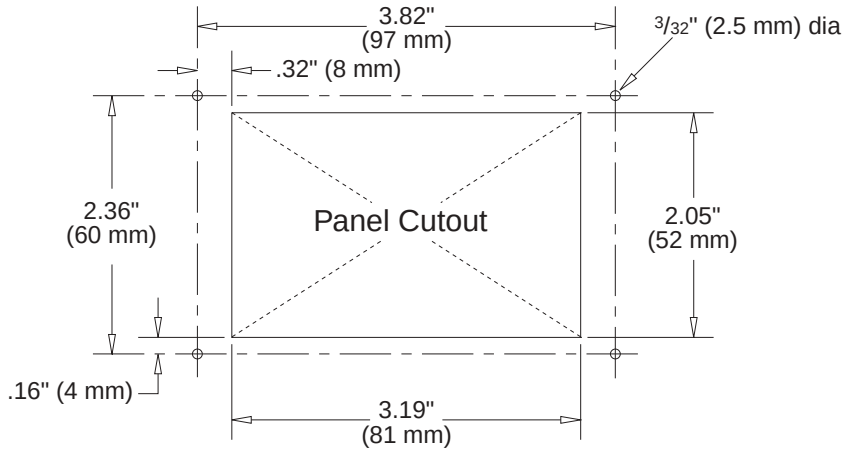


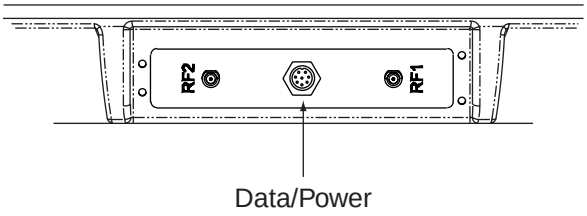
Figure 2-12
Switchplate Panel Cutout Dimensions

A full-scale panel cutout template has been provided in Appendix C.

2.3.1 Connecting the Antenna Data/Power Cable

1. Connect one end of the antenna data / power cable to the antenna's data / power connector and lock in place (see Figure 2-13).

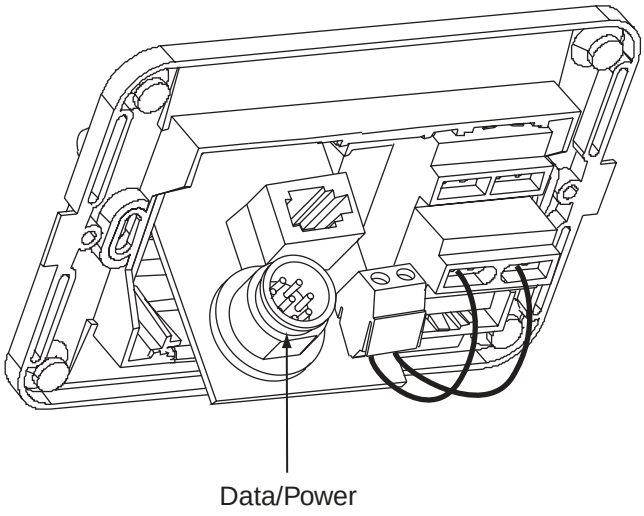
Figure 2-13
Antenna Data/Power Connector



2. Route the other end of the data / power cable down through the cable access hole in the deck and out through the switchplate panel cutout.

3. Connect the data / power cable to the switchplate's data / power connector and lock in place (see Figure 2-14).

Figure 2-14
Switchplate Data/Power Connector



2.3.2 Connecting to Vessel Power

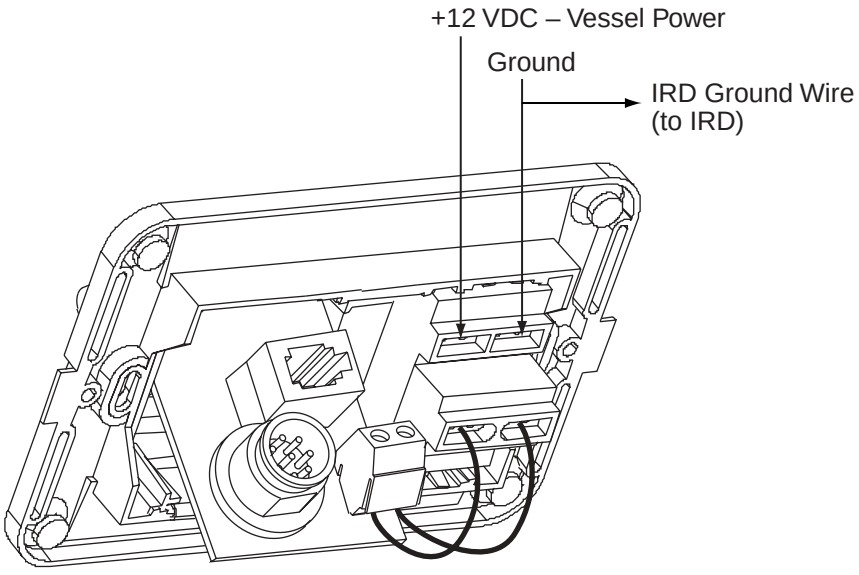
Recommended Power Wiring

Short circuits may result in severe electrical shock or burns. Turn off vessel power and test the circuit to ensure that no power is present before connecting the power cable.

The switchplate requires an 11-16 VDC power input. A quick-tripping circuit breaker or fuse should be installed between the switchplate and vessel power. Circuit overload protection should be rated for 5 amperes. If vessel power fluctuates widely or is noisy, a 12 VDC 5-amp AC/DC power supply or a wide-range DC/DC converter power supply should be installed. *Test the voltage and polarity before making connections to vessel power.*

Connecting the Power Cable to the Switchplate

1. Disconnect vessel power by removing the appropriate vessel fuse.
2. Connect the switchplate to vessel power as pictured in Figure 2-15.



Before connecting the antenna unit to vessel power, remove the appropriate vessel fuse to prevent a short circuit.

Figure 2-15
Switchplate Power Wiring

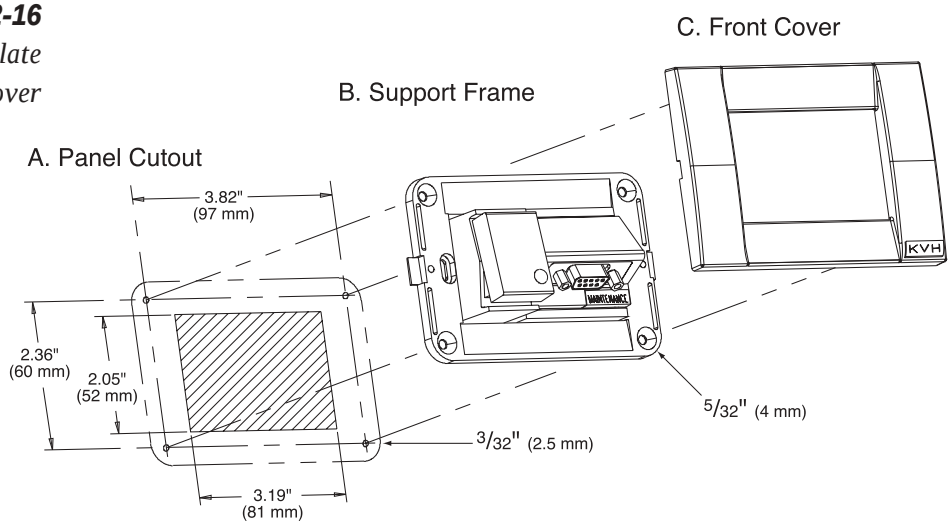
2.3.3 Connecting the IRD Ground Wire

A grounding wire (Cable #32-0583-50) has been provided to connect your IRD to a suitable ground and protect the system. Attach the grounding wire to any suitable screw on the rear panel of the IRD with a good contact with the IRD chassis. The other end should be connected to a suitable ground, ideally the ground connector on the switchplate (see Figure 2-15).

2.3.4 Installing the Switchplate

After completing the switchplate wiring process, you must install the switchplate itself. This process, detailed in the following steps, is illustrated in Figure 2-16.

Figure 2-16
Mounting the Switchplate Support Frame and Front Cover

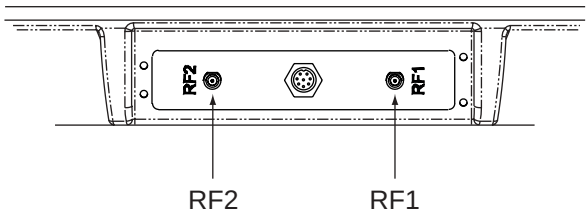


Before securing the switchplate to the mounting surface, be sure to strain-relieve the wires connecting to the switchplate connectors. Several tie-wraps have been provided to aid in strain-relieving the wires.

1. Fit the switchplate assembly and support frame into the panel cutout made in Step 2 of *Section 2.3, "Connecting System Components,"* and flush to the mounting surface.
2. Drill out four 5⁄32" (4 mm) holes in the countersunk settings in the switchplate support frame.
3. Drill four 3⁄32" (2.5 mm) holes in the mounting surface using the countersunk holes in the support frame as the template. Secure the support frame and switchplate assembly to the mounting surface using four #6 self-cutting screws.
4. Snap the front cover into place to cover the screws and support frame.
5. Reinstall the vessel fuse removed in Step 1 of *Section 2.3.2, "Connecting to Vessel Power."*

2.3.5 Connecting the Antenna RF Signal Cable to the IRD

1. Route an RF cable up through the deck's cable access hole.
2. Connect the RF cable to the antenna's RF1 connector (see Figure 2-17). Once the cable is securely connected, loosen the sealing nut at the base of the RF1 connector and tighten it onto the end of the RF cable.



3. Connect the other end of the RF cable to the IRD's SATELLITE IN connector.

When shipped from the factory, the antenna's RF connectors are protected with caps. Leave the cap installed on the RF2 connector unless you are going to connect a second RF cable to the TracVision C3.

Figure 2-17
Antenna RF Connectors

2.3.5.1 Installing Two IRDs and TVs *(North American Systems Only)*

To connect a second TV and IRD to the TracVision C3 system, you must connect a second RF cable to the antenna's RF2 connector (see Figure 2-17). Route the other end of the RF cable down into the vessel and connect it directly to the second IRD.

KVH recommends the use of RG-6 or RG-11 (75 ohms) cable for RF wiring. Use of non-RG-6 or RG-11 (75 ohms) cables will result in degraded performance. The KVH warranty does not cover degraded performance due to improper wiring.

2.3.5.2 Connecting Three or More IRDs and TVs *(North American Systems Only)*

To install three or more IRD/TV pairs, an active multiswitch (Channel Master model 6214IFD or equivalent) must be placed between the antenna unit and the IRDs. Figure 2-18 illustrates typical wiring arrangements for multiple IRDs. Mount the multiswitch unit in accordance with the manufacturer's instruction sheet.

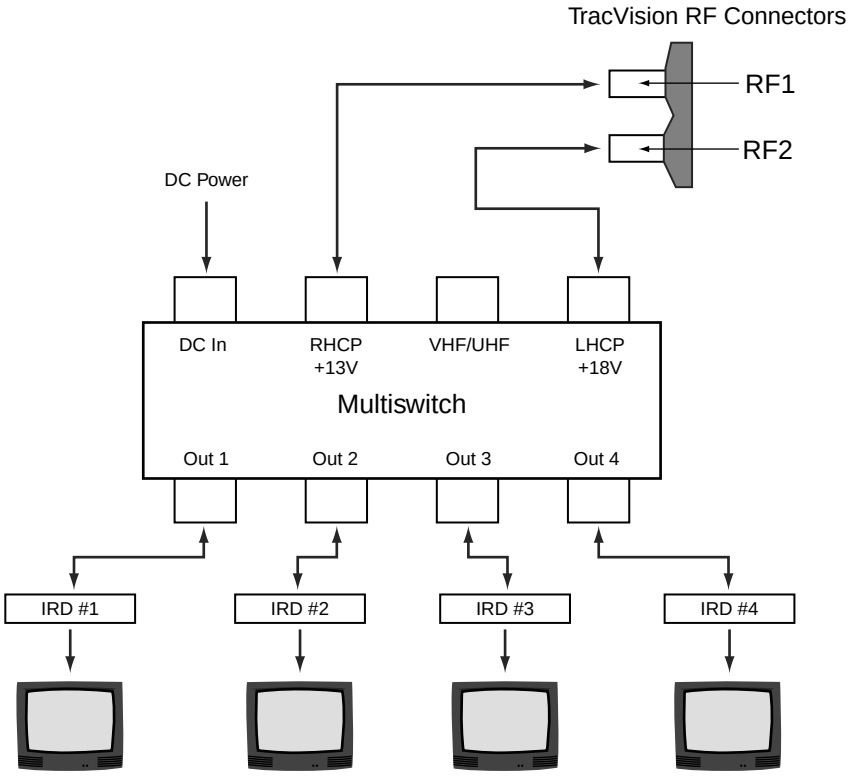


Figure 2-18
Installing Three or More IRDs Using an Active Multiswitch (North American Systems Only)

TracVision C3 has the capability to switch from one satellite to another when you choose TV channels that are carried by your two selected satellites. However, the use of an active multiswitch may interfere with the 22 KHz tone sent by DIRECTV DSS Plus™ IRDs to the antenna. As a result, the antenna may not receive the signal to change satellites when you change channels using your DIRECTV DSS Plus remote.

In this case, you will need to use the optional TV/SAT Switch or a PC as described in* *Section 3.2, "Changing Channels and Switching Between Satellites."*

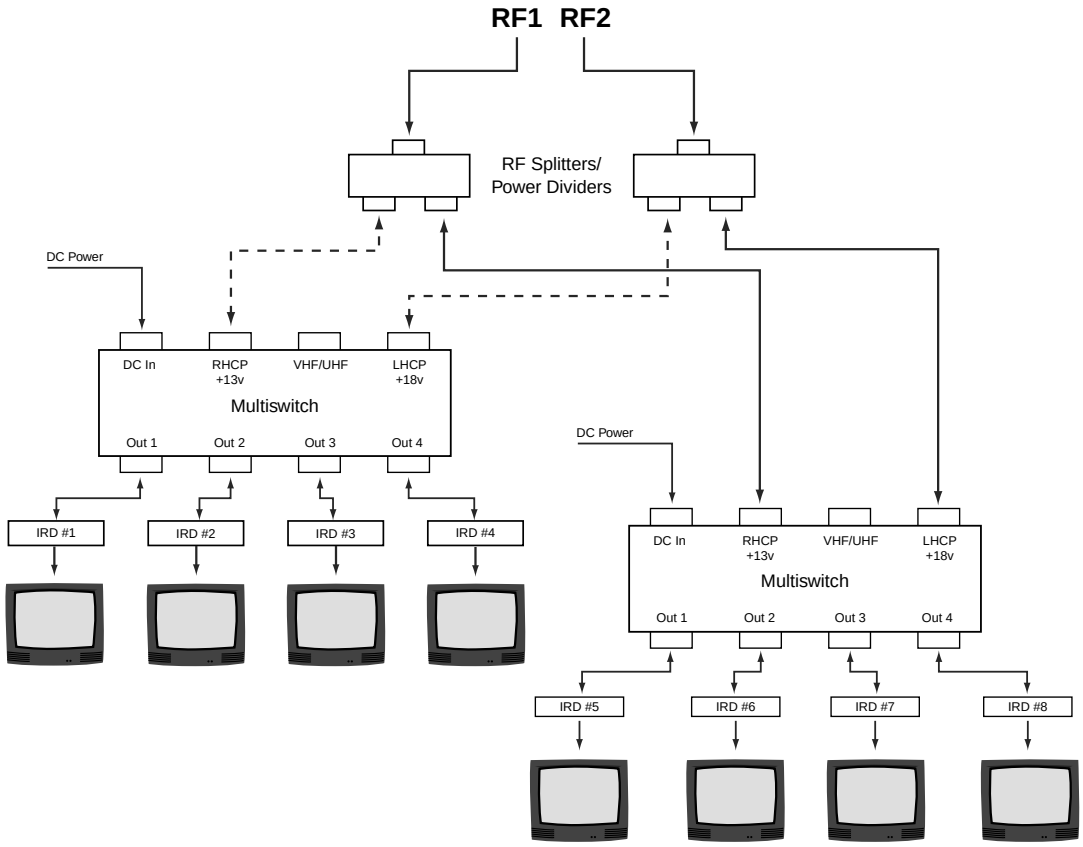
** To order a TV/SAT Switch (KVH Part Number 01-0245), please call +1 401 847-3327.*

1. Connect the RF cable tagged "RF1" to the multiswitch input labeled "LNB RHCP +13V."
2. Connect a second RF cable to the multiswitch input labeled "LNB LHCP +18V."
3. Connect the multiswitch outputs to individual IRD inputs. Use RG-6 cable terminated with F-type connectors for all RF connections.
4. Terminate all unused output connectors with 75 ohm DC blocks (Channel Master #7184, Radio Shack #15-1259 or equivalent).

Installing More than One Multiswitch

If there is a need for more than four IRDs, it is possible to carry out a multiple multiswitch installation, as illustrated in Figure 2-19.

Figure 2-19
Connecting to Multiple Multiswitches (North American Systems Only)



2.4 Activating the IRD

DIRECTV and DISH Network IRD Activation

KVH makes it easy to activate your DIRECTV or EchoStar (DISH Network) IRD. Just call KVH at 1-888-584-4163 and ask for **IRD Activation** (Monday - Friday, 8:30 a.m. - 5:00 p.m. EST). For other options, please refer to the user manual that accompanied your IRD.

Other IRD Activations

Please refer to the user manual that accompanied your IRD for activation instructions.

2.5 Selecting the Active Satellite

As noted previously, TracVision C3 can track a variety of DVB-compatible and DSS (DIRECTV) satellites. The system contains a preprogrammed library of European and North American satellites. It also has two open slots that you may use to program two additional satellites of your choice. Tables 2-3 and 2-4 provide listings of the possible satellite pairs. Two of these satellites may be selected to reside in the system's active memory as Satellites A and B.

Table 2-3
Available European Satellite Pairs (European LNB required)

	Astra 1	Astra 2N	Astra 2S	Hispasat	Hotbird	Sirius	Thor
Astra 1		✓	✓		✓	✓	
Astra 2N	✓				✓		
Astra 2S	✓				✓		
Hispasat							
Hotbird	✓	✓	✓			✓	
Sirius	✓				✓		✓
Thor						✓	

Table 2-4
Available N. American Satellite Pairs (U.S.-style LNB Required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu
DSS_101		✓					
DSS_119	✓						
Echo_61				✓	✓		✓
Echo_110			✓		✓	✓	✓
Echo_119			✓	✓		✓	✓
Echo_148				✓	✓		✓
Expressvu			✓	✓	✓	✓	

The satellites listed in TracVision C3's preprogrammed satellite library will be sufficient for most users. However, if you wish to install one or two user-defined satellites, proceed to *Section 2.5.2, "Programming User-defined Satellites."* After configuring the user-defined satellites, return to the satellite installation process in *Section 2.5.1, "Installing Your Selected Satellites."*

2.5.1 Installing Your Selected Satellites

When you first connect to the system, it is programmed with the factory default satellite assignments:

- Europe: Astra 1 (Sat A) and Hotbird (Sat B)
- N. America (US DIRECTV): DSS_101 (Sat A) and DSS_119 (Sat B)
- N. America (US DISH Network): Echo_119 (Sat A) and None (Sat B)
- N. America (ExpressVu): Expressvu (Sat. A) and None (Sat. B)

Should you wish to track a different satellite (either from the satellite library or a user-defined satellite), you must instruct the antenna which satellites will be in the active satellite pair.

Connecting to the TracVision C3 Maintenance Port

To do so, it is necessary to connect a PC to the terminal maintenance port on the switchplate. The diagnostics procedure requires terminal emulation software such as PROCOMM or Windows Terminal or Hyperterminal. Use the settings appropriate to your application.

1. Connect one end of the PC data cable to the DB9 connector on the switchplate. Connect the other end to the serial port on the PC (a 9-pin / 25-pin connector adapter may be needed for some PCs).
2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control

The satellite configuration on your IRD must match the satellite setting on the TracVision C3 system.

*Satellite A on the TracVision C3 must be the same satellite as IRD Alternative 1 (or A, based on your IRD) and must be assigned the IRD DiSEqC 1 setting.**

*Satellite B on the TracVision C3 must be the same satellite as IRD Alternative 2 (or B, based on your IRD) and must be assigned the IRD DiSEqC 2 setting.**

Refer to your IRD user manual for complete instructions for your IRD.

** DiSEqC settings only apply to European systems.*

3. Apply power to the TracVision C3 system and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup.

Installing the Satellite of Choice

Once the data connection has been made between the PC and the TracVision C3, you must assign the satellites you wish to have in the satellite pair. On the maintenance screen, put the antenna in Idle Mode by typing **HALT**, then enter the SATINSTALL command:

Command:	**SATINSTALL,<sat_a_name>,<sat_b_name><cr>** *(<cr> indicates a carriage return/ENTER key)*
Where:	<sat_a_name> = the name of your choice for Satellite A <sat_b_name> = the name of your choice for Satellite B

Table 2-5 lists the assigned names for satellites that are in the preprogrammed European and North American satellite library. If you do not wish to assign a pair of satellites, enter **None** as the name of Satellite B.

After you have assigned satellites as Satellites A and B, the final step is to tell the antenna which of the two satellites it should acquire and track. This step should be carried out the first time a satellite is selected, allowing the system to carry out the initial download of the channel guide. To do so, enter the Satellite Selection parser command as follows:

Command:	**@L,x<cr>**
Where:	x = A or B (one of your selected satellites as defined during the SATINSTALL process)

Choosing A or B will assign the antenna to acquire and track that installed satellite. To complete the process, type **ZAP<cr>** to restart the system. Be sure the IRD satellite configuration matches your chosen TracVision C3 settings.

Table 2-5
Installation Names

Satellite	Install Name
European Satellites	
ASTRA1 19.2°E	ASTRA1
ASTRA2N 28.2°E	ASTRA2N
ASTRA2S 28.2°E	ASTRA2S
Hispasat 30.0°W	HISPASAT
Hotbird 13.0°E	HOTBIRD
Sirius 5.0°E	SIRIUS
Thor 0.8°W	THOR
North American Satellites	
DSS 101°W	DSS_101
DSS 119°W	DSS_119
EchoStar 61°W	Echo_61
EchoStar 110°W	Echo_110
EchoStar 119°W	Echo_119
EchoStar 148°W	Echo_148
ExpressVu	Expressvu
Other Installation Designations	
User-defined 1	USER1*
User-defined 2	USER2*
None	None

** USER1 and USER2 will only be available if one or two user-defined satellites have been added to the library as detailed in* Section 2.5.2, "Programming User-defined Satellites."

For example, to assign Astra 2S and Hotbird for your satellite pair, and to track Astra 2S, you would enter the following data:

SATINSTALL,ASTRA2S,HOTBIRD<cr>

@L,A<cr>

ZAP<cr>

2.5.2 Programming User-defined Satellites

The TracVision C3 satellite library has two open slots that you may use to program two user-defined satellites in case you want to install / watch a satellite that is not in the KVH predefined list. To configure a user satellite, the system must first be in Idle Mode (by typing **HALT**) and then information about the satellite must be provided, including:

- Satellite name
- Satellite position (longitude)
- Transponder information for each of the following polarizations / frequencies:
  - vertical high & vertical low
  - horizontal high & horizontal low

  or

  - right
  - left
- Transponder information includes:
  - frequency
  - symbol rate
  - FEC code, and
  - network ID (in hexidecimal format)
- Decoder type

This information can be obtained from your satellite service provider or from sites on the Internet, such as *www.satcodx.com*.

For your reference, the satellite configuration information for the predefined satellites is available on our web site at www.kvh.com/footprint/index.html.

Entering User-defined Satellite Data

Once the link between the PC and the TracVision C3 is established as described in *Section 2.5, "Selecting the Active Satellite,"* it is necessary to provide initial longitude data regarding the user-defined satellite. To do so, enter the SATCONFIG parser command via PC as follows:

Command:	**SATCONFIG,USERX,YYY,Z,D,L<cr>** *(<cr> indicates a carriage return/ENTER key)*
Where:	X = 1 or 2 (satellite alternative) YYY = longitude (0-180) Z = E (East) or W (West) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB) L = LNB polarization (C = circular, L = linear)
Function:	configures one of the user-configurable satellites with the longitude provided
Response:	if valid entry, echoes the input data if invalid entry, returns error message

After entering the SATCONFIG command, you must turn on the DEBUG mode by typing **@DEBUGON**. Following the entry of the SATCONFIG and DEBUGON commands, enter the satellite transponder information via PC as follows:

Command:	**@SATCONFIG,X,N,F,S,C,ID,P,B,D<cr>**
Where:	@SATCONFIG = directs data to the RF Board X = satellite location A or B N = satellite table # (98 & 99 are slots for user-configured satellites) F = frequency in MHz (either 00000 or a range from 10700 - 12700) S = the satellite transponder symbol rate in Mbit/second (01000 - 29999) C = the FEC code (e.g., 12, 23, 34, 56, 67, 78) ID = the satellite network ID in hexidecimal format (0x####) P = the LNB polarization (v = vertical, h = horizontal, r = right, l = left) B = the LNB down conversion frequency (l = low, h = high, u = USA) D = decoding type (0 = test, 1 = DSS-A, 2 = DSS-B, 3 = DVB)

This information has to be entered for each of the four transponder categories:

- vertical high
- vertical low
- horizontal high
- horizontal low

or

- right
- left

TracVision C3 requires that the data fields for all four transponder categories be provided. If the selected satellite does not have information for one or more of the transponder categories, default information should be entered in the fields as follows:

Table 2-6
Default Transponder Values

Transponder Data	Default Value
Frequency	00000
Symbol Rate	27500
FEC Code	the same value as provided for those transponders with data
Network ID	0x0000
Polarity and Band	whichever combinations are not already provided

After entering this information, it is necessary to save these settings. To do so, type:

@SAVE,A (or **@SAVE,B** if data is for User2 satellite)

@DEBUGOFF

After completing this process, restart the system by either cycling power or typing **ZAP**.

One of your user-defined satellite options has now been added to the TracVision C3 satellite library. This option will now be available the next time the SATINSTALL command is given.

An Example of Configuring a User-defined Satellite (Europe)

The following is an example of configuring the fictional YOURSAT 101 as the USER1 configured satellite. Prior to configuring this satellite or any others, be certain to get the most up-to-date information from one of the sources previously discussed.

Table 2-7
Sample User-defined Satellite Configuration (Europe)

YOURSAT 101 at 7 West, DVB decoder, Linear Polarization LNB

Horizontal High	
Frequency	11.966 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048 (dec) = 0x0800
Vertical High	
Frequency	11.823 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048(dec) = 0x0800
Vertical Low	
No Data Listed	
Horizontal Low	
No Data Listed	

Based on this information, the data entered via the PC would look like this, assuming that YOURSAT 101 would be Satellite A:

```
SATCONFIG,USER1,7,W,3,L
@DEBUGON
@SATCONFIG,A,98,11966,27500,34,0x0800,H,H,3
@SATCONFIG,A,98,11823,27500,34,0x0800,V,H,3
@SATCONFIG,A,98,00000,27500,34,0x0000,V,L,3
@SATCONFIG,A,98,00000,27500,34,0x0000,H,L,3
@SAVE,A
@DEBUGOFF
ZAP
```

An Example of Configuring a User-defined Satellite (N. America)

The following is an example of configuring the fictional YOURSAT 101 as the USER1 configured satellite. Prior to configuring this satellite or any others, be certain to get the most up-to-date information from one of the sources previously discussed.

Table 2-8
Sample User-defined Satellite Configuration (N. America)

YOURSAT 101 at 71 West, DVB decoder, Circular Polarization LNB

Right	
Frequency	11.966 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048 (dec) = 0x0800
Left	
Frequency	11.823 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048(dec) = 0x0800

Based on this information, the data entered via the PC would look like this, assuming that YOURSAT 101 would be Satellite A:

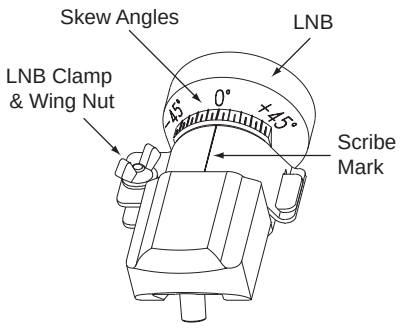
```
SATCONFIG,USER1,71,W,3,C
@DEBUGON
@SATCONFIG,A,98,11966,27500,34,0x0800,R,U,3
@SATCONFIG,A,98,11823,27500,34,0x0800,L,U,3
@SAVE,A
@DEBUGOFF

ZAP
```

2.6 Setting the Skew Angle *(European Systems Only)*

The Antenna LNB skew angle must be adjusted to optimize channel reception. Refer to your satellite service provider for the proper skew angle for the selected satellite service and geographical location. The skew angle for KVH predefined satellites can also be obtained by using a PC connected to the maintenance port. Enter your latitude and longitude using the GPS command (refer to *Appendix E.6* for details) and then type **SKEWANGLE**. The system will respond with the skew angle for whichever satellite is currently selected.

Adjusting the LNB Skew Angle

Figure 2-20
Skew Adjustment



1. Determine the skew angle for the selected satellite and region.
2. Loosen the wing nut on the LNB clamp so that the LNB can be moved.
3. Carefully rotate the LNB so that the scribe mark on the LNB clamp is aligned with the proper angle measurement.
4. Tighten the wing nut and LNB clamp to secure the LNB.

2.7 Checking Out the System

To complete the TracVision C3 installation, it will be necessary to verify that the system functions properly. Critical to ensuring that the system is configured and operating properly is to check the system startup routine to ensure that the system is operating within normal parameters.

To do so, it is necessary to connect a PC to the terminal maintenance port. The diagnostics procedure requires terminal emulation software such as PROCOMM or Windows Terminal or Hyperterminal. Use the settings appropriate to your application.

1. Connect one end of the PC data cable to the DB9 connector on the switchplate. Connect the other end to the serial port on the PC (a 9-pin/25-pin connector adapter may be needed for some PCs).

2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control
3. Apply power to the TracVision C3 system and the IRD and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup. *A sample startup sequence has been provided in* Appendix D.
4. After completing the review of the startup and operational routines, turn on the IRD and television and check the channels on the selected satellites. For European systems, view both horizontally and vertically polarized channels, if possible.
5. When all checks are completed, shut down the system.

If a need arises to paint the radome, ***only use non-metallic paint*** *to avoid degrading the RF signal strength and the reception quality. The KVH warranty does not cover degraded performance resulting from a painted radome.*